UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/663,964	09/19/2000	William R. Babbitt	5922-56160	5387

7590 04/22/2003

JAMES Y. GO, ESQ.
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CA 90025-8600

EXAMINER	
JUBA JR, JOHN	
ART UNIT	**PAPER NUMBER**
2872	

DATE MAILED: 04/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/663,964	BABBITT ET AL.	
	Examiner	Art Unit	
	John Juba	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 December 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *27-44 and 52-54* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *27-44 and 52-54* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 4, 2002 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 27, 28, 30 – 34, 36 - 39, 42 – 44, and 52 – 54 are rejected under 35 U.S.C. 102(b) as being anticipated by Weiner, et al (*IEEE J. Quantum Elec.*). Referring *initially* to Figure 1 and the associated text, Weiner, et al disclose

an active material ("thermoplastic plate"); and

an ordered assemblage of subgratings supported by the active material for receiving input pulses along an input path (*e.g.,* "signal beam" in Fig. 1a) and transmitting output pulses along an output path (*e.g.,* "reconstructed beam" in Fig. 1b).

A portion of the "assemblage" is illustrated in the "expanded view" of Figure 1a. Weiner, et al discloses (Pg. 2252, lines 7-11) that *each* spectral component of the pulse in the first beam is stored as a series of fringes (*i.e.,* a "subgrating") due to interference with the *corresponding* spectral component of the pulse in the second beam. It will be appreciated that, since the plurality of spectral components are angularly dispersed by the grating (leftmost in the figure) to be spatially distributed across the surface of the "active medium" in an orderly fashion, the "assemblage", is an "ordered assemblage" of subgratings, wherein each subgrating corresponds to one of the spatially spread spectral components. At the bottom of the first column of text on Page 2252, Weiner, et al explain how an output pulse is derived from the assemblage of gratings. The respective spectral components diffract from corresponding subgratings, in proportion to their original weighting. At the bottom of the first column of text on Page 2253, Weiner, et al explain how the role of "reference" and "signal" beams can be interchanged. This result is not unexpected, given the analogy expressly drawn between the disclosed method and "traditional spatial-domain Fourier-transform holography" (last five lines on Pg. 2251). Further, Weiner, et al disclose that both the "reference" pulse and "signal pulse" can be spectrally encoded (Pg. 2252, first column, lines 13-17). One of ordinary skill would recognize this as being analogous to spatially-encoding a "reference" beam used when storing data spatially encoded in an "object" beam. Under such circumstances, it will be appreciated that the corresponding data can only be retrieved with a playback beam that is spatially encoded in the same way as the original reference beam. Accordingly, the results reported in connection with Figure 6 (Section

III at "C.") should not be unexpected. Weiner, et al disclose a composite grating comprising a frequency non-selective "active" material (thermoplastic) and an ordered assemblage ("fringe pattern") of subgratings supported thereby for receiving input pulses and transmitting output pulses, each subgrating satisfying a grating condition to diffract light from an input path to an output path. Referring to section III at "C 1)",

> a first input optical pulse having a first, phase encoded temporal waveform produces an output waveform (Fig. 6b) having a prescribed output temporal waveform, whereas a second input pulse, not having the prescribed input temporal waveform does not produce an output pulse having the prescribed temporal waveform, but rather, produces a pseudorandom noise burst (*e.g.*, Fig. 6d).

The characterization of the coding as "address" encoding is not recognized as positively limiting the structure. The content of the message is not germane to the structure for encoding and/or storing the message. Further, since only the appropriately encoded playback pulse retrieves the desired result, the information encoded therein may fairly be regarded as an "address".

With regard to claim 28, a portion of the input pulse ("test beam") passes through the grating assemblage, undiffracted (see Fig. 1b). Thus to the extent that the input pulse and output pulse ("reconstructed pulse") are of finite spatial extent, the two pulses *inherently* overlap at least partially.

With regard to claims 34, 38, 39, and 52 - 54, Weiner, et al disclose a preferred embodiment which employs a "thin holographic medium" (Pg. 2252, bottom of second

column) in which Bragg angle selection is not required. Both amplitude and phase of the interfering beams is recorded (bottom of first column, Pg. 2252). Thus, it will be appreciated that the preferred embodiment is one in which a surficial grating condition must be satisfied. However, one of ordinary skill would recognize the reference to "angular multiplexing" atop Page 2257 as a clear reference to Bragg angle selection in the hologram of a non-preferred embodiment.

With regard to claims 36 and 42, Weiner, et al employ a frequency non-selective recording medium, as described on Page 2251, second column , second paragraph.

With regard to claims 37, *et seq.,* a detected output waveform is plotted in each of Figures 6a – 6d. Thus, the apparatus of Weiner, et al had to include a detector "capable of detecting an optical pulse having a prescribed detectable temporal waveform (impulse) different from each of the set of specific [input] temporal waveforms". Differently encoded waveforms are multiplexed using differently encoded input pulses (See Section III, at C 2 on Pg. 2257; "Storage . . .). Clearly "retrieval" of the original waveform, or verification of such requires a detector capable of detecting the encoded waveform. The characterization of the coding as "address" encoding is not recognized as positively limiting the structure. The content of the message is not germane to the structure for encoding and/or storing the message. Further, since only the appropriately encoded playback pulse retrieves the desired result, the information encoded therein may fairly be regarded as an "address".

With further regard to claim 43, the data source was similar to that of Figure 1, but incorporated a set of phase masks for data encoding.

With regard to claim 44, the case of angularly multiplexed holograms discussed atop Page 2257 fairly comprehends data routing. One of ordinary skill would appreciate that angularly multiplexed recordings will be "routed" to different locations upon playback.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 29, 35, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Weiner, et al (*IEEE J. Quantum Elec.*). As set forth above for claims 27, 28, and 37, Weiner, et al disclose the invention substantially as claimed. However, Weiner, et al do not disclose an actual embodiment in which the output pulse travels in a direction opposite to the direction of the input pulse, or subgratings which comprise index variations. Nonetheless, Weiner, et al disclose such prophetic embodiments in the paragraph immediately preceding their "Acknowledgement " on Page 2260. That is, one of ordinary skill will recognize the suggestion to use "photorefractives" as a suggestion to modify the active medium to be one in which the subgratings comprise refractive index variations. Thus, it would have been obvious to provide the subgratings with refractive index variations, in the interest of permitting the subgrating assemblage to be adaptively reconfigures, as expressly suggested by

Weiner, et al. Similarly, one of ordinary skill will appreciate that "feedback of from the output beams back to the input" would involve the output pulse traveling in a direction opposite to the input pulse. Thus, it would have been obvious to one of ordinary skill to have the output pulse traveling in the direction opposite to the input pulse, in the interest of permitting associative recall of pulse waveforms, as expressly suggested by Weiner, et al.

Response to Amendment

Applicants' amendment and response are not sufficient in overcoming the rejection of claims 27, 28, 30 – 34, 36 - 39, 42 – 44, and 52 – 54 under 35 U.S.C. § 102(b) as being anticipated by Weiner, et al (*IEEE J. Quantum Elec.*). However, upon reconsideration of the claim language with respect to the reference, the rejection of claims 29 and 40 on these grounds is *withdrawn*. From the standpoint of wave propagation and unit vectors, the expression "direction opposite to the input direction" has particular meaning which is distinct from the examiner's previous interpretation that waves entering and exiting a medium are traveling in "opposite directions".

Applicants argue that Weiner, et al are "limited to" embodiments which do not involving spatial routing of optical beams. This is unpersuasive because, Weiner, et al anticipate every positively recited structural limitation of the claims, as set forth in the rejection. Applicants have not identified specific features recited in the claims that distinguish over the prior art in this regard. Further, the examiner believes that one of ordinary skill would recognize that angular multiplexing of the beams, as taught by Weiner, et al, is a disclosure of routing within the specificity recited. As set forth in the

rejection, the recitation of an input beam as being "address encoded" fails to distinguish, since the beam coding effectively determines whether the prescribed output is invoked. The reference is relied upon for what it conveys to one of ordinary skill. Whether or not Weiner, et al identify their message content as an "address", *ipsissimis verbis*, is immaterial, since the message performs the same function. In any event, the examiner does not believe the message content of the beam to be germane to the patentability of the structure which is, *at least* in every other respect, disclosed in the prior art.

Applicants argue that the examiner has not demonstrated that the holographic fringe pattern of Weiner, et al is identical to the "ordered assemblage of gratings" recited in the claims. In response, the examiner has included further explication of this feature in the rejection. The reference is relied upon for what it fairly conveys to one of ordinary skill. The examiner believes that one having familiarity with holography would recognize that the "fringe pattern" is only stable for beam components which are mutually coherent. Thus, the "fringe pattern" is an assemblage of individual gratings, one for each pair of mutually coherent beam components. Insofar as each grating is formed from spectral components that are spatially spread in accordance with scalar diffraction theory, it is unclear how anyone would regard the gratings as "disordered".

The rejection of claims 27 – 31, 33, 35 - 38, 40 – 44, and 52 under §102(e) as being anticipated by Kashyap, et al (U.S. Patent number 5,530,666) is *withdrawn* in light of the following remarks. Although Kashyap, et al disclose an address decoder that controls data routing, the assemblage of gratings responds to a succession of pulses, rather than to a single pulse having a prescribed encoded waveform. That is, the input

"waveform" recited in the claims, is now recognized as being the waveform of *an* optical pulse, rather than the waveform of a pulse stream, as would be the case in Kashyap, et al. For the same reason, the rejection of claims 34, 39, 53, and 54 under §103(a) as being unpatentable over Kashyap, et al (U.S. Patent number 5,530,666), in view of BRITISH TELECOMMUNICATIONS (WO 93/14424) is *withdrawn*. BRITISH TELECOMMUNICATIONS fail to cure the aforementioned deficiency in Kashyap, et al.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A.M. Weiner, et al (*Optics Letters* 17(3)) disclose spectral holography for pulse recording and readout.

P.C. Sun, et al (*Optics Letters* 20(16)) disclose spectral holography for temporal to spatial conversion.

P. Hariharan (Optical Holography) discusses the physics of hologram formation in photothermoplastic recording media.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (703) 308-4812. The examiner can normally be reached on Mon.-Fri. 9 - 5.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JOHN JUBA
PRIMARY EXAMINER
Art Unit 2872

April 18, 2003